Prevalence and Correlates of Caregiver-Reported Mental Health Conditions in Youth With Autism Spectrum Disorder in the United States

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ABSTRACT

Objective: Mental health conditions (MHCs) have substantial personal and economic costs for children with autism spectrum disorder (ASD); yet, a current population-based prevalence estimate is lacking.

Methods: This study included 42,283 caregivers of children (ages 3–17 years) from the 2016 population-based National Survey of Children's Health. Prevalence and correlates of caregiver-reported MHCs were estimated in children with ASD and compared with those in children with intellectual disability (ID), children with special health care needs (SHCN), and "all others" (no ASD, SHCN, or ID).

Results: 77.7% of children with ASD had ≥ 1 MHC; 49.1% had ≥ 2. The most common MHCs were behavior/conduct problem (60.8%), anxiety problem (39.5%), attention deficit disorder (ADD)/attention-deficit/hyperactivity disorder (ADHD) (48.4%), and depression (15.7%). Substance abuse was the only MHC less common in ASD. MHCs were more common in youth with ASD versus SHCN, "all other" youth, and those with ID. MHCs were common in ASD by ages 3–5 years (44.8% ≥ 1 condition) and increased with age (85.9% ≥ 1 condition, ages 12–17 years). Among children with ASD, girls had twice the odds of an anxiety problem, those with ID had 4 times the odds of behavior/conduct problem, and those with childhood adversity had greater odds of an anxiety problem (odds ratio [OR] = 2.66) and ADD/ADHD (OR = 1.99).

Conclusions: Caregiver-reported MHCs are prevalent in children with ASD in the US from a young age and characterize > 85% by adolescence. There is an outsized need for effective MHC assessment and treatment of these youth that demands expedient innovation in both MHC and developmental disability policy and practice.

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Autism spectrum disorder (ASD) is associated with significant, typically lifelong, functional impairment and public health challenges and is growing in prevalence.[1] People with ASD experience co-occurring health conditions at above-average rates[1] that may adversely affect quality of life as well as the complexity and cost of their care.[2–7] Co-occurring mental health conditions (MHCs), such as anxiety, attention, mood, and behavior disorders, are a part of this burden.[2,4,6,7] Croen et al[2] found that health care utilization was more common and costlier for youth with ASD in the US, particularly in those with ASD and MHCs, whose mean annual health care costs were 45% higher than for children without ASD. Children with ASD and MHCs also experience more childhood adversity and have poorer health outcomes, more self-injury, and parents with greater stress than those with ASD alone.[7–9] Accordingly, the US Interagency Autism Coordinating Committee[10] has called for increased research on MHCs to improve both health outcomes and quality of life for individuals with ASD.

Though cumulative evidence from multiple sources suggests an increasing prevalence of MHCs in general population children,[11] a current population-based estimate of MHCs in children with ASD is lacking. An older (2008) epidemiologic study of 112 10- to 14-year-old children, recruited in the United Kingdom, found 71% met criteria for ≥ 1 MHC, with 41% meeting for ≥ 2.[12] Anxiety disorders (42%) were most common, followed by oppositional/conduct disorders (30%) and attention-deficit/hyperactivity disorder (ADHD; 28%). Using the population-based 2003–2004 National Survey of Children's Health (NSCH), Gurney et al[13] also reported on the prevalence of caregiver-reported behavior/conduct (58.9%), ADHD (45.1%), and anxiety/depression problems (38.9%) in children with ASD. More recent studies have relied on community and clinical samples but also suggest substantial comorbidity. Salazar et al[14] found that 90.5% of 4- to 9-year-olds with ASD recruited from community settings in the UK met criteria for a MHC, with anxiety disorders (79%) and ADHD (59%) being most common. In youth (ages 3–17 years) referred to a psychopharmacology program, Joshi et al[4] found 95% had ≥ 3 and 74% ≥ 5 MHCs.

Findings from non-epidemiologic samples may not generalize to the population and are prone to selection bias (eg, a child's MHC may increase contact with the clinical or educational setting sampled). Existing population-based studies are also outdated and have identified few MHC indicators in ASD,[12,13] though others studies suggest age, intellectual ability, and sex may be influential.[14–16] A current population-level estimate of MHCs and associated characteristics (eg, age, sex, other clinical indicators)

Clinical Points

- Over 75% of US children with autism spectrum disorder (ASD) have ≥ 1 mental health conditions; ~50% have ≥ 2. These rates are greater than in children with other developmental and health conditions.
- Older children with ASD are at greater risk. Among children with ASD, girls and children exposed to adversity experience more anxiety, children with intellectual impairments experience more behavior problems, and children with adversity experience more anxiety and ADHD.

in youth with ASD would help to describe the scope of this issue and identify subgroups of children at higher risk. Such estimates can inform clinical practice, program planning, and public policy and help clinicians destigmatize MHCs with patients and families by noting their high prevalence and normalizing the pursuit of treatment objectives. Moreover, an updated US estimate is warranted given changes in the prevalence of MHCs in the general population and in the prevalence and characteristics of children with ASD, over 67% of whom now present without intellectual disability (ID).[17,18]

Caregiver report of conditions is often relied upon in epidemiologic research.[6,7,13,17,19] Though misclassification bias can be a concern, research suggests ASD prevalence estimates based on caregiver report versus more rigorous strategies converge.[17,18,20] Moreover, an advantage of this method may be that it provides a more sensitive (if also less specific) measure of children with ASD and significant mental health needs than traditionally defined and measured diagnostic criteria, which research suggests may not capture the distinct presentation of MHCs in ASD, particularly in children with ID.[16,21–24]

The present study used the 2016 National Survey of Children's Health (NSCH), a population-based survey of US caregivers of children, to (*a*) estimate current lifetime prevalence of caregiver-reported MHCs in children with ASD compared to other subgroups; (*b*) estimate MHC prevalence by developmental period (young children, children, adolescents); and (*c*) identify correlates (age, IQ, sex, adversity history) of MHCs in ASD.

METHODS

Data Source

Data for this study came from the 2016 NSCH, designed by the Health Resources and Services Administration's Maternal and Child Health Bureau and conducted by the US Census Bureau (see Ghandour et al[25]). The NSCH is a cross-sectional, nationally representative survey designed to provide national estimates on the health and well-being of children from caregiver report.[26] A total of 50,212 surveys were completed, with an overall weighted response rate of 40.7%. For households with a known child, the response rate was 69.7%.[27]

Participants

This study included 42,283 caregivers of children (ages 3–17 years) from the 2016 NSCH, including 1,131 children identified by caregivers as having a current ASD diagnosis. Caregivers were asked if a doctor or other health care provider had *ever* told them that their child had "autism or autism spectrum disorder, including diagnoses of Asperger's disorder or pervasive developmental disorder." Caregivers who endorsed this question were asked if the child *currently* had that diagnosis. Only children reported to have a current ASD diagnosis were considered cases (see Figure 1). Youth and household characteristics included gender, age, race, ethnicity, family income as a percentage of the federal poverty level, family structure, and child insurance status. Caregivers who reported current ASD were asked to define it as "mild," "moderate," or "severe." This severity item has been associated with poorer functioning and increased services use[28,29] but not validated against an ASD measure.

We defined 3 groups for comparison. The first group (n = 267) was youth with current ID but not ASD. As with autism, ID status was based on whether a caregiver endorsed that the child currently had that condition as per diagnosis from a doctor or other health care provider. The second group, special health care needs (SHCN), was composed of youth who screened positive on the SHCN screener but did not have current ASD or ID (n = 9,541). The SHCN screener is composed of 5 items that aim to flag children who use more services than a typical child, have a functional limitation, or have a chronic or ongoing health condition.[30] The third group was the rest of the sample (n = 32,344), excluding those with current ASD, ID, or SHCN.

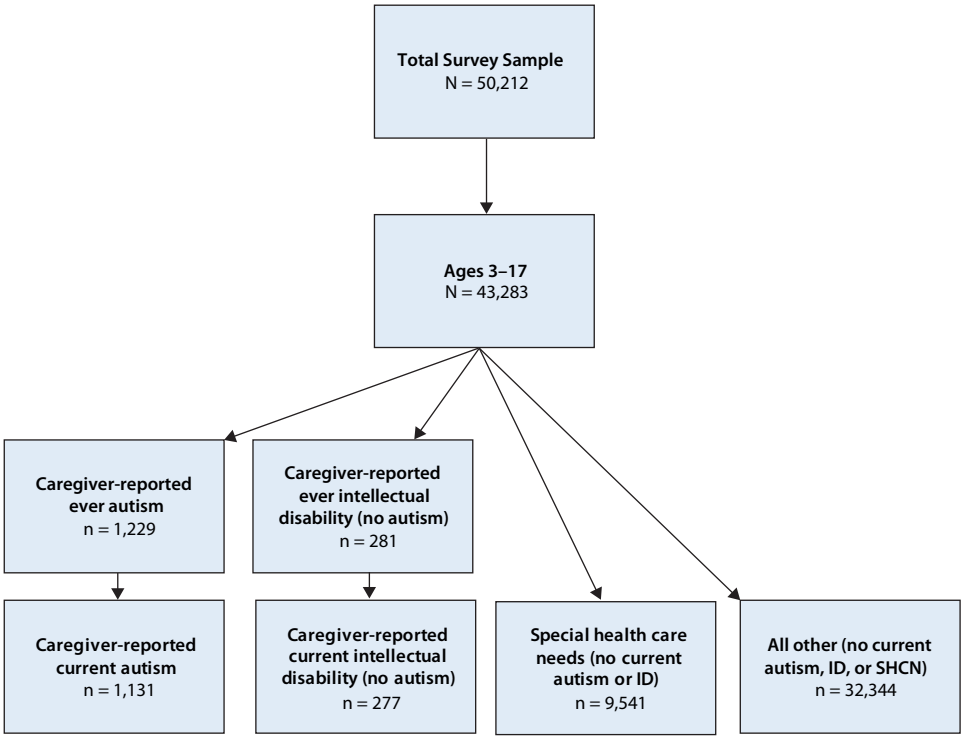
Mental Health Comorbidity

MHCs in this study included the following items selected from the "health conditions" portion of the NSCH: anxiety problem, depression, behavior/conduct problem, Tourette syndrome, ADD/ADHD, and substance abuse disorder (for youth 6 to 17 years old only; see Ghandour et al[25] for a complete list of conditions in this section). As with autism, conditions were included if a caregiver endorsed that the child currently had that condition as per diagnosis from a doctor or other health care provider.

Adverse Childhood Experiences

The 2016 NSCH asked about 9 adverse childhood experiences (ACEs): (1) since the child was born, it was hard to cover basics like food or housing on the family's income somewhat often or very often, the child ever (2) lived with a parent who got divorced or separated after the child was born, (3) lived with a parent or guardian who died, (4) lived with a parent or guardian who served time in jail or prison after the child was born, (5) saw or heard parents or adults slap, hit, kick, or punch one another in the home, (6) was a victim of violence or witnessed violence in the neighborhood, (7) lived with anyone who was mentally ill, suicidal, or severely depressed, (8) lived with

Figure 1. Selection of Study Sample From 2016 National Survey of Children's Health



Abbreviations: ID = intellectual disability, SHCN = special health care needs.

anyone who had a problem with drugs or alcohol, or (9) were treated or judged unfairly because of his or her race or ethnic group. We constructed an indicator for the presence of ≥ 2 ACEs, which has been associated with MHCs in ASD in prior research.[8]

Analysis

We began with an examination of all demographic and disability variables described for youth age 3–17 years with and without ASD. Endorsement of each current condition was then presented by age group for youth with ASD: ages 3–5, 6–11, and 12–17 as in prior reports.[6,25,31] To ensure adequate sample size for reliable inference, we calculated the relative standard error (RSE) by dividing the standard error by the proportion estimate and did not report estimates with an RSE greater than 50%. Estimates with an RSE greater than 30% were noted.[32]

Next, we examined differences in prevalence for anxiety problem, depression, behavior/conduct problem, and ADD/ADHD between ASD and each group (ID, SHCN, all other). We estimated a multivariable logistic regression model for each MHC and each comparison group compared to ASD. All analyses were weighted per the survey design. For a given model, groups were entered as a dummy variable. The resulting odds ratio was the adjusted odds of the MHC for ASD versus the comparison group. Each regression model controlled for age, gender, household income, race, ethnicity, family structure, child insurance status, and presence of ≥ 2 ACEs, given prior research suggesting an association of ACEs and mental health conditions in youth.[8] Last, we explored predictors (age, ID, sex, and ≥ 2 ACEs) of 4 MHCs for youth with autism aged 3–17 years. Each MHC (anxiety problem, depression, behavior/conduct problem, ADD/ADHD) was the outcome in its own multivariable logistic regression model, including age, gender, household income, race, ethnicity, family structure, child insurance status, and caregiver-reported autism severity. Age of autism diagnosis was considered as a covariate of interest but was excluded from final models due to missingness in 9% of observations; exploratory complete case analysis resulted in similar findings to analysis with all observations irrespective of age of diagnosis missing status. Two interactions were tested in each model—gender and presence of ≥ 2 ACEs and age and gender—per studies suggesting sex disparities in ACEs in the general population[33] and in MHC trajectories in the general population[34] and in ASD.[35]

RESULTS

Population Characteristics

The estimated population prevalence of ASD was 2.6%, consistent with recent surveys of ASD in the US.[17,19] Compared to children without ASD, the ASD group was significantly more likely to be male (79.0%), be living below or at the federal poverty line (30.9%), have a single mother family structure (25.1%), have public health insurance (57.1%), have ≥ 2 ACEs (27.8%), and have a diagnosis of ID (16.8% ASD vs < 1% no ASD; Table 1).

Table 1. Population Descriptive Characteristics of Youth Aged 3–17 Years (N = 43,027)

Characteristic	No ASD % (95% CI) (n = 41,896)	ASD % (95% CI) (n = 1,131)	*P* Value
Male	50.2 (49.1–51.3)	79.0 (73.7–83.5)	<.000
Age, mean, y	10.0 (9.9–10.1)	10.3 (9.8–10.8)	.409
Race			
White	67.6 (66.6–68.7)	66.7 (60.8–72.1)	.752
Black or African American	14.2 (13.4–14.9)	15.2 (11.4–20.0)	.624
Other[a]	18.2 (17.3–19.1)	18.1 (13.8–23.3)	.955
Hispanic	24.8 (23.6–25.9)	24.1 (18.4–30.9)	.829
Poverty level			
50%–99% FPL	21.3 (20.3–22.4)	30.9 (24.9–37.5)	.001
100%–199% FPL	22.2 (21.2–23.2)	20.5 (16.4–25.4)	.493
200%–399% FPL	26.7 (25.8–27.5)	24.0 (19.9–28.7)	.265
400%+ FPL	29.9 (29.0–30.7)	24.6 (20.6–29.1)	.025
Family structure			
Two-parent biological	66.8 (65.7–67.8)	60.2 (54.2–65.8)	.024
Two-parent stepfamily	7.6 (7.0–8.2)	6.2 (4.3–8.9)	.287
Mother-only household	16.2 (15.4–17.1)	25.1 (20.2–30.8)	<.000
Other structure	9.4 (8.76–10.1)	8.5 (5.5–12.9)	.647
Type of insurance			
Public-only or public and private	35.6 (34.4–36.7)	57.1 (51.5–62.6)	<.000
Private only	58.1 (57.0–59.3)	40.7 (35.4–46.3)	<.000
Uninsured	6.3 (5.7–7.0)	2.2 (1.3–3.6)	<.000
Age at ASD diagnosis, mean, y		4.9 (4.5–5.3)	
ASD severity			
Mild		47.6 (41.8–53.5)	
Moderate		43.3 (37.5–49.4)	
Severe		9.1 (6.5–12.5)	
Experienced 2 or more ACEs	17.8 (16.9–18.6)	27.8 (22.8–33.4)	<.000
Caregiver-reported, current mental health conditions			
Intellectual disability	0.6 (0.5–0.9)	16.82 (13.3–21.1)	<.000
Anxiety	6.3 (5.8–6.8)	39.51 (33.9–45.3)	<.000
Depression	2.8 (2.5–3.1)	15.71 (11.7–20.8)	<.000
Conduct/behavior problem	5.9 (5.5–6.4)	60.75 (54.9–66.3)	<.000
ADHD	7.9 (7.4–8.4)	48.39 (42.6–54.2)	<.000
Tourette syndrome	0.2 (0.1–0.3)	1.80 (0.9–3.4)	<.000
Substance abuse	0.2 (0.1–0.3)	0.01 (0.00–0.1)	.003
Diagnosed with 1 or more MHCs currently	14.1 (13.4–14.8))	77.73 (72.2–84.4)	<.000
Diagnosed with 2 or more MHCs currently	6.2 (5.7–6.6)	49.11 (43.3–54.9)	<.000

[a]"Other" included Asian, Native Hawaiian or other Pacific Islander, American Indian or Alaska Native, some other race, or more than 1 race.
Abbreviations: ACE = adverse childhood experience, ADHD = attention-deficit/hyperactivity disorder, ASD = autism spectrum disorder, FPL = federal poverty line.

Table 2. Prevalence of Caregiver-Reported Mental Health Conditions (MHCs)[a] in Youth With Current Autism Spectrum Disorder by Age Group

	Ages 3–5 y		Ages 6–11 y		Ages 12–17 y	
	Proportion (%)	95% CI	Proportion (%)	95% CI	Proportion (%)	95% CI
Anxiety problem	11.50[b]	4.85–24.87	35.11	27.02–44.16	54.26	46.57–61.75
Depression	…[c]	…	11.70	6.44–20.35	25.03	18.18–33.41
Conduct/behavior problem	35.89	22.76–51.55	69.24	60.08–77.10	61.02	53.55–68.19
ADD/ADHD	14.05[b]	6.62–27.39	48.98	39.55–58.49	59.70	52.97–66.87
One or more MHCs	44.80	29.71–60.92	81.44	72.62–87.89	85.93	81.64–89.34
Two or more MHCs	12.64[b]	5.76–25.50	49.65	40.17–59.15	61.70	54.16–68.71

[a]Mental health conditions include caregiver-reported anxiety problem, depression, ADD/ADHD, Tourette's syndrome, behavior/conduct problem, substance use disorder.
[b]Relative standard error (RSE) is ≥ 30%; proportion estimate may be unreliable. RSE = SE/proportion estimate.
[c]RSE ≥ 50%, estimate not reported.
Abbreviations: ADD = attention deficit disorder, ADHD = attention-deficit/hyperactivity disorder.

Prevalence of Mental Health Conditions

Per caregiver report, 77.7% percent of youth with ASD had ≥ 1 MHC and 49.1% had ≥ 2, in contrast to 14.1% ($P < .001$) and 6.2% ($P < .001$) of youth without ASD, respectively. Conduct/behavior problem (60.8%), ADD/ADHD (48.4%), anxiety problem (39.5%), and depression (15.7%) were most commonly reported. Substance abuse was significantly less common in ASD ($P = .003$) (Table 1).

Unadjusted rates of more prevalent conditions were examined by age in the ASD group (Table 2). Among children (6–11 years), 81.4% had ≥ 1 MHC and 49.7% had ≥ 2. In adolescents (12–17 years), the rate of ≥ 1 MHC

Table 3. Adjusted Odds of Caregiver-Reported Mental Health Conditions for Youth With ASD Versus Comparison Groups[a]

	ID (no ASD)		SHCN (no ASD or ID)		All Other (no ASD, ID, or SHCN)	
Predictor	OR (95% CI)	*P* Value	OR (95% CI)	*P* Value	OR (95% CI)	*P* Value
Anxiety problem current	6.30 (3.50–11.36)	<.000	3.02 (2.29–3.98)	<.000	27.51 (19.81–38.19)	<.000
Depression current	2.13 (1.05–4.33)	.037	1.74 (1.14–2.67)	.011	22.32 (13.07–38.09)	<.000
Behavior/conduct problem current	2.10 (1.13–3.94)	.022	4.89 (3.70–6.46)	<.000	89.67 (65.05–123.60)	<.000
ADD/ADHD current	6.30 (3.50–11.36)	<.000	3.02 (2.29–3.98)	<.000	27.51 (19.81–38.19)	<.000

[a]All models versus current ASD diagnosis. All models adjusted for age, sex, poverty level, race, has 2 or more adverse childhood experiences, family structure, and child insurance status.
Abbreviations: ADD = attention deficit disorder, ADHD = attention-deficit/hyperactivity disorder, ASD = autism spectrum disorder, ID = intellectual disability, SHCN = special health care needs.

Table 4. Predictors of Caregiver-Reported Mental Health Conditions in Youth With ASD Aged 3–17 Years[a]

	Anxiety Problem		Depression		Behavior/Conduct Problem		ADD/ADHD	
Predictor	OR (95% CI)	*P* Value	OR (95% CI)	*P* Value	OR (95% CI)	*P* Value	OR (95% CI)	*P* Value
Age	1.1 (1.09–1.23)	<.000	1.15 (1.06–1.25)	.001	1.64 (1.23–2.18)	.001	1.16 (1.10–1.22)	<.000
Age^2					0.97 (0.96–0.99)	<.000		
Female	2.00 (1.08–3.69)	.028	0.67 (0.29–1.54)	.344	0.90 (0.47–1.72)	.741	0.58 (0.32–1.09)	.090
ID	1.44 (0.77–2.68)	.254	1.28 (0.57–2.91)	.551	4.32 (2.17–8.61)	<.000	1.35 (0.75–2.44)	.323
2+ ACEs	2.66 (1.51–4.69)	.001	2.12 (0.98–4.62)	.058	1.27 (0.69–2.34)	.445	1.99 (1.14–3.48)	.016

[a]All models control for family income, race/ethnicity, caregiver-reported autism severity, family structure, and child insurance status. A second order age term was included in the behavior/conduct problems based on regression diagnostics.
Abbreviations: ACE = adverse childhood experience, ADD = attention deficit disorder, ADHD = attention-deficit/hyperactivity disorder, ASD = autism spectrum disorder, ID = intellectual disability.

was similar (85.9%) to that in children, but ≥2 MHCs was more prevalent (61.7%). Young children (ages 3–5) had fewer MHCs overall (44.8%, 1 or more; 12.6%, 2 or more).

Multivariable regression models, adjusting for age, sex, poverty level, race, family structure, child insurance status, and ACEs, compared the odds of different caregiver-reported MHCs in youth with ASD relative to ID (no ASD), SHCN (no ASD or ID), and all other (no ASD, ID, or SHCN; Table 3). Per caregiver report, children with ASD had significantly higher odds of anxiety problem, depression, behavior/conduct problem, and ADD/ADHD relative to all comparison groups. The odds of depression (OR = 2.1, $P = .037$), ADD/ADHD (OR = 6.3, $P \leq .000$), behavior/conduct problem (OR = 2.1, $P = .022$), and anxiety problem (OR = 6.3, $P \leq .000$) were significantly greater in youth with ASD versus youth with ID and approximately 2–5 times (OR = 1.7–4.9, at $P \leq .01$) greater than in SHCN. Compared to the "all others" group, odds of MHCs were 22.3 to 89.7 times greater in children with ASD (at $P \leq .000$).

Indicators of Mental Health Conditions in ASD

Examination of the unadjusted rates of individual conditions by age group indicated potential condition by age associations (Table 1). Consistent with descriptive results in Table 1, adjusted analyses suggested that all MHCs were significantly more likely to occur among older children (Table 4); notably, this relationship was stronger in younger children for behavior/conduct problems. In addition to age, female sex (OR = 2.0, $P = .028$) and 2+ ACEs (OR = 2.7, $P = .001$) were associated with increased odds of anxiety problem in ASD, parent report of ID was positively associated with a diagnosis of behavior/conduct problem (OR = 4.3, $P \leq .000$), and 2+ ACEs was significantly associated with parent report of ADD/ADHD (OR = 2.0, $P = .016$). There were no significant interactions between age and gender or ACEs and gender.

DISCUSSION

The present study investigated the prevalence of caregiver-reported MHCs in children with ASD given a lack of recent population-based estimates. Similar to community, clinical, and older population-based studies,[8,13,36–40] results of this nationally representative survey of US parents confirm a high rate of MHCs in children with ASD, significantly greater than that observed in children from the general population and children with other developmental and health conditions. Substance abuse was singularly less common in ASD. Studies suggest ASD may protect against substance abuse in childhood[41–43]; however, substance abuse has been observed in 19%–30% of adults with ASD in clinical settings.[44,45] Notably, the MHC disparity between children with ASD and "all others" (ie, those without ASD, SCHN, or ID) was dramatic: the odds of specific MHCs were 22 (anxiety) to 89 (behavior/conduct) times greater for children with ASD; this disparity may increase risk for substance abuse later in life.[43,46]

The most prevalent MHCs in children with ASD were conduct/behavior (60.8%), ADHD (48.4%), and anxiety problems (39.5%), a pattern consistent with insurance record[47] and structured interview[12,14,48] and questionnaire studies.[36,49] Although difficult to compare, rates of most MHCs were similar to those from studies describing a limited range of MHCs in older NSCH data.[8,13] Similar rates of overall MHCs and anxiety conditions were also reported in a 2008 population-based study using a structured interview[12]; however, rates of ADHD and oppositional/conduct disorders

were lower, potentially due to measurement differences. NSCH items may assess symptoms viewed as problematic and an area of health care need by practitioners, whether or not they meet specific diagnostic criteria or might be more parsimoniously conceptualized as aspects of ASD.[50,51] Prior research finds poor agreement between community and research diagnoses.[51,52] Future work should draw on refined approaches for differentiating MHCs and ASD[53–56] to interpret this mismatch and inform practice and policy. Applying existing diagnostic categories and criteria strictly and hierarchically (ie, attributing overlapping symptoms to a primary disorder rather than comorbidity) may discourage overpathologizing of children with ASD, but also underestimate MHCs that manifest distinctly due to ASD co-occurrence.[15,16,22] Ultimately, researchers must clarify the extent to which MHCs per community versus research diagnoses signal distinct challenges, trajectories, and treatment needs for children with ASD. In the interim, caregiver-reported MHCs in ASD provide an important estimate of the current burden US families and health care systems face.[7]

Elevated MHCs were noted in ASD for all age groups but were greatest for adolescents. This may suggest an early MHC risk in ASD that persists and accumulates with age. Interview and questionnaire studies in young children with ASD and emerging longitudinal research support this view.[14,35,57] However, it is also plausible that some MHC criteria become more relevant and observable with age. Findings recommend further examination into the presentation and trajectory of MHCs in ASD and into prevention as well as intervention programs, which have focused on school-age youth.[58,59]

Correlates of MHC risk in ASD were also identified. Among children with ASD, an anxiety problem was associated with greater childhood adversity and female sex, ADD/ADHD was associated with greater childhood adversity, and a behavior/conduct problem was associated with ID. Older age was the only significant indicator of depression in ASD, but this aligns with Gotham et al.[35] Findings are also supported by research linking lower IQ with challenging behavior[60,61] and adversity with MHCs in ASD.[8] Adversity is a well-established risk factor for poorer health that has been relatively underinvestigated in ASD and warrants attention.[62,63] The increased prevalence of caregiver-reported anxiety problems in females with ASD, which is also relatively novel,[15] has been observed in some recent reports,[35,64,65] though not all.[66] Girls with ASD, particularly those without ID (a growing subpopulation),[67] may be particularly vulnerable to anxiety.[68]

A study limitation is reliance solely on caregiver-reported MHCs, a method that lacks diagnostic precision as illustrated in the mixed terminology of the "Health Conditions" section of NSCH, which groups problems (eg, anxiety problem) with disorders (eg, ADD/ADHD). Caregiver reports may also be biased by caregiver characteristics (eg, recall accuracy) and disparities in mental health care and diagnostic practices, particularly among minorities. MHCs may be underdetected in children with ASD due to a tendency to attribute mental health symptoms to ASD itself[69] or potentially due to reduced opportunities for medical care and timely diagnosis in minority youth with ASD.[70–72] On the other hand, MHCs may also be overdiagnosed in some youth to enhance access to needed services or due to provider stereotypes or biases.[51,71,72] A study comparing community versus structured evaluations of MHCs in youth with ASD would help to evaluate these possibilities. Nonetheless, caregiver-reported MHC is significantly associated with poorer health and service utilization in ASD[7,73] and thus provides a useful perspective regarding the mental health needs of children with ASD.

Our findings speak to the current circumstances of youth with ASD in the US, the majority of whom will be identified with MHCs that are likely to increase their interactions with the health system and the national demand for specialized care. Evidence-based assessment and treatment of MHCs in ASD[53,54,58,59,74] should be used to reduce this demand by clarifying which children are most in need of and likely to benefit from available treatments. Nonetheless, there is an incongruence between the ubiquity of MHCs in ASD and the disconnected disciplines and support systems for developmental disability and mental health that exist. Advances in research are likely to be realized only if steps are also taken to implement health care policies and training initiatives that support integrated developmental and mental health care going forward.

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Additional information: The original data set for the National Survey of Children's Health is available from the HRSA Maternal and Child Health Bureau (https://census.gov/data/datasets/2016/demo/nsch/nsch2016.html).

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Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Childhood and Adolescent Mental Health section. Please contact Karen D. Wagner, MD, PhD, at kwagner@psychiatrist.com.